IN THE CLAIMS:

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strikethrough~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

1. (currently amended) A bar code recognizing method of reading a bar code using optical equipment, including:

an image extracting process of extracting a line of image data by scanning a bar code;

a character area dividing process of detecting an inflection point of a curve indicating a relationship between each pixel of the image data and a gray scale value for the pixel, and dividing ~~the line of the extracted image into patterns forming characters~~the extracted image into a number of character areas corresponding to a total number of the detected inflection points; and

a pattern converting process of dividing the character area into a predetermined number of module areas, determining a value of each module by comparing a gray scale value of a pixel in each module with a predetermined gray scale value, and converting the divided patterns into characters.

2. (original) The method according to claim 1, further comprising

an image data converting process of converting multi-valued image data into gray scale image data having a single color element when the line of image data extracted in the image extracting process is multi-valued image data having a plurality of color elements, and providing resultant data for a character area dividing process.

3. (original) The method according to claim 1, further comprising

an image data complementing process of complementing deficient data in the line of image data extracted in the image extracting process and providing resultant data for the character area dividing process.

4. (original) The method according to claim 1, wherein said character area dividing process comprises:

a bar number detecting process of detecting a total number of black bars and white bars contained in a bar code;

a character number detecting process of detecting a number of characters contained in a bar code corresponding to a total number of black bars and white bars; and

a boundary determining process of determining a boundary of the pattern corresponding to the number of detected characters.

5. (original) The method according to claim 4, wherein in said bar number detecting process, a total number of black bars and white bars can be detected corresponding to the number of inflection points in a curve indicating the line of image data.

6. (original) The method according to claim 5, wherein in said bar number detecting process, a number of inflection points for which a difference between a peak value and a bottom value of a curve including the inflection points exceeds a predetermined value is counted in the inflection points.

7. (original) The method according to claim 1, wherein in said character area dividing process, a boundary of a pattern forming the character is obtained from inflection points of a curve indicating the line of image data.

8. (original) The method according to claim 7, wherein in said character area dividing process, a boundary of the pattern is obtained from inflection points for which a difference between a peak value and a bottom value of a curve including the inflection points exceeds a predetermined value in the inflection points

9. (original) The method according to claim 7, wherein in said character area dividing process, an inflection point indicating a negative tilt when a black bar exists as a leftmost bar in a pattern forming the character, and an inflection point indicating a positive tilt when a white bar exists as a leftmost bar are starting boundaries of the pattern.

10. (original) The method according to claim 7, wherein in said character area dividing process, an inflection point indicating a positive tilt when a black bar exists as a rightmost bar in a pattern forming the character, and an inflection point indicating a negative tilt when a white bar exists as a rightmost bar are terminating boundaries of the pattern.

11. (original) The method according to claim 1, wherein said pattern converting process comprises:

a module area dividing process of dividing the divided pattern by a number of modules having a width of a smallest unit forming a black bar or a white bar of a bar code;

a module value determining process of determining as a module value whether the divided module forms a black bar or a white bar; and

a module data converting process of converting the pattern formed by the module into a character.

12. (original) The method according to claim 11, further comprising

a threshold computing process of computing a threshold for determination as to whether the value of the module is black or white, wherein in said module value determining process, data of pixel contained in each of the divided modules is compared with the threshold, thereby determining a value of a module.

13. (original) The method according to claim 12, wherein in said module value determining process, in pixels contained in the module, a number of pixels whose image data is higher than a threshold is compared with a number of pixels whose image data is lower than the threshold, thereby determining a value of a module.

14. (original) The method according to claim 12, wherein in said module value determining process, in an area enclosed by a curve indicating the line of image data and the threshold in the module, an area above the threshold is compared with an area below the threshold, thereby determining a value of a module.

15. (original) The method according to claim 12, wherein in said threshold computing process, frequency distribution of image data is obtained using the line of image data, and an average value between two pieces of data respectively corresponding to a peak in a portion containing a largest data value in the frequency curve and a peak in a portion containing a smallest data value is defined as a threshold.

16. (original) The method according to claim 12, wherein in said threshold computing process, frequency distribution of image data is obtained using the line of image data, and the

frequency curve is divided into two areas by a median between a maximum value and a minimum value of the image data, and an average value between two pieces of data respectively corresponding to a largest peak in a large area of image data and a largest peak in a small area of image data is defined as a threshold.

17. (original) The method according to claim 12, wherein in said threshold computing process, the line of image data is divided into the patterns, and the threshold is computed for each pattern.

18. (original) The method according to claim 1, further comprising

a threshold computing process of computing a threshold for use in obtaining a boundary of a pattern forming the character using the line of image data, wherein a boundary of the pattern is obtained from intersection points of a curve indicating the line of image data and the computed threshold.

19. (original) The method according to claim 18, wherein in said threshold computing process, frequency distribution of image data is obtained using the line of image data, and an average value between data respectively corresponding to a peak in a portion containing a largest data value and a peak in a portion containing a smallest data value in the frequency curve is defined as a threshold.

20. (original) The method according to claim 18, wherein in said threshold computing process, frequency distribution of image data is obtained using the line of image data, and the frequency curve is divided into two areas by a median between a maximum value and a minimum value of the image data, and an average value between two pieces of data respectively corresponding to a largest peak in a large area of image data and a largest peak in a small area of image data is defined as a threshold.

21. (currently amended) A decoding apparatus for bar code recognition which recognizes bar code data read by optical equipment, comprising:

an image extraction unit extracting a line of image data by scanning a read result of a bar code by the optical equipment;

a character area division unit dividing the line of the extracted image into patterns forming character~~s~~ areas responsive to a gray scale inflection point of pixels of the line; and a pattern conversion unit converting the divided patterns into characters by dividing the charters areas into module areas, comparing gray scale pixel values of the module areas with a reference gray scale value and converting responsive to the comparing.

22. (original) The apparatus according to claim 21, wherein said optical equipment comprises a medium detection unit for detecting a medium on which a bar code is printed; and

said image extraction unit extracts the line of image data corresponding to the medium detection result.

23. (original) The apparatus according to claim 22, wherein said medium detection unit is an optical switch for optically detecting a medium.

24. (currently amended) A computer-readable storage medium storing a program used to direct a computer for performing a process of recognizing bar code data read by optical equipment to perform~~ the steps of~~:

extracting a line of image data by scanning a read result of a bar code by the optical equipment;

dividing the line of the extracted image into patterns forming characters areas responsive to a gray scale inflection point of pixels of the line; and

converting the divided patterns into characters by dividing the charters areas into module areas, comparing gray scale pixel values of the module areas with a reference gray scale value and converting responsive to the comparing.

25. (currently amended) A decoding apparatus for bar code recognition which recognizes bar code data read by optical equipment, comprising:

image extraction means for extracting a line of image data by scanning a read result of a bar code by the optical equipment;

character area division means for dividing the line of the extracted image into patterns forming characters areas responsive to a gray scale inflection point of pixels of the line; and

pattern conversion means for converting the divided patterns into characters by dividing the charters areas into module areas, comparing gray scale pixel values of the module areas with a reference gray scale value and converting responsive to the comparing.

26. (original) The apparatus according to claim 25, wherein:

said optical equipment comprises medium detection means for detecting a medium on which a bar code is printed; and

said image extraction means extracts the line of image data corresponding to the medium detection result.

27. (original) The apparatus according to claim 26, wherein said medium detection means is an optical switch for optically detecting a medium.